

I raise two issues for our current understanding of the distribution & interpretation of embedded questions.

**I. 1. True and potential answers** Ex. (1a) is veridical: It entails—in fact, presupposes—the truth of the embedded proposition  $p$ . Ex. (1b) is non-veridical: it neither entails the truth, nor the falsity of  $p$ . Compare with (2a) and (2b), where *know* and *agree* embed a polar question  $Q$ . Ex. (2a) entails that İsa believes the true answer to  $Q$  (a true answer reading), while (2b) lacks this entailment (a potential answer reading).

- (1) a. İsa knows [that it's snowing] $_p$ .  $\rightarrow p$       (2) a. İsa knows [whether it's snowing] $_Q$ .  
 b. İsa & Ömer agree [that it's snowing] $_p$ .  $\nrightarrow p$       b. İsa & Ömer agree [whether it's snowing] $_Q$ .

Spector and Egré (2015) propose that an attitude verb that takes both declaratives and questions is veridical wrt a declarative if and only if it is veridical wrt a question. In this context, being veridical (resp. non-veridical) with respect to a question means having a true answer reading (resp. a potential answer reading).

**I. 2. The puzzle of the missing potential answer reading** ► Turkish is a language where factivity alternates (Özyıldız 2017, 2018). This means that some predicates may occur both in sentences that carry the veridical implication of (1a), and in sentences that lack it. Exx. (3a) and (3b) have the same attitude verb *hatırla-* ('remember'). When the attitude verb bears nuclear ACcent, the sentence is veridical, (3a); When the embedded object bears the accent, the sentence is non-veridical, (3b). (Speakers who do not percieve (3b) as non-veridical may check their intuition for the sentence with a *diye* clause instead of the nominalization. The argument will remain unaffected. Nominalizations simplify the discussion of embedded questions.)

- (3) a. İsa [kar yağdığını] $_p$  hatırlıyor.  $\rightarrow p$       b. İsa [KAR yağdığını] $_p$  hatırlıyor.  $\nrightarrow p$   
 İsa snow precipitate.NMZ remember      İsa snow precipitate.NMZ remember  
 İsa remembers that it's snowing.      İsa thinks he remembers that it's snowing.

Predicates that participate in factivity alternations may embed questions, in (4). Then, they give rise to true answer readings, but not to potential answer readings: It is contradictory ( $\perp$ ) to follow up the attitude report in (4) with the assertion that İsa's belief is mistaken. The position of nuclear accent makes an interpretive difference for embedded declaratives. It does not for questions. The potential answer reading is missing.

- (4) İsa [kar yağıp yağmadığını] hatırlıyor.  $\perp$  Ama yanılıyor.  
 İsa snow precipitate.OR precipitate.NMZ remember. but he's mistaken  
 a. Available: İsa remembers whether it's snowing.  $\perp$  But he's mistaken. [true answer]  
 b. Unavailable: İsa has a memory about whether it's snowing.  $\checkmark$  But he's mistaken. [potential answer]

The same observation holds for other factivity alternating languages like Bangla, Buryat, Cypriot Greek, Hungarian, Uyghur, etc. (For anonymity, I redact the names from whom these p.c.'s came from.)

► From the perspective of Spector & Egré's generalization, the true answer reading is expected because *hatırla-* gives rise to veridical declarative embedding, e.g., (3a), and a potential answer reading is expected because of (3b), where *hatırla-* gives rise to non-veridical declarative embedding. It is reasonable to think that (perhaps some of) the semantic properties that a verb gives rise to in declarative embedding carry over to question embedding. Veridicality is a good candidate for such a property: Question embedding under verbs like *hatırla-* often reduces to a special form of declarative embedding, which veridicality is a property of. This might involve treating questions directly as propositions (Groenendijk & Stokhof 1984), or extracting a proposition from non-propositional question denotations via answerhood operators (Hamblin 1973, Karttunen 1977, Heim 1994, Dayal 1996, a.o.). As a result, I believe that Spector & Egré's generalization is on the right track and should be maintained. (See also *misremember* below, showing a similar correspondance.)

► The account for the missing potential answer reading cannot assume that the truth in a true answer reading uniformly comes from the embedded question because potential answer readings exist, as in (1b), or (5b) below. One viable hypothesis is that *hatırla-* is in fact a factive verb (*pace* Özyıldız). This explains true answer readings, but the non-veridical (3b) becomes a mystery again. Alternatively, there might be a property that non-veridical embedding under *hatırla-* has, that triggers deviance when the verb composes with a question. The latter approach is proposed by Saebø (2007), Theiler et al. (2017) and Mayr (2018) for the unacceptability of question embedding under verbs like *believe* and *think* (see section II. 3.).

**II. 1. False answer readings** The embedded declarative in (5a) and question in (5b) are introduced by the predicate *hatırla-* (‘remember’) modified by the adverb *yanlış* (‘wrongly’). This complex predicate is similar to English *misremember*, for which the following observations also hold. Under the relevant reading, (5a) implies that the embedded proposition is false and that the attitude holder believes it. Ex. (5b) implies that the attitude holder believes the false answer to the polar question. This, I call a false answer reading.

- (5) a. İsa [kar yağıdığını] yanlış hatırlıyor.  
 İsa snow precipitate.NMZ wrongly remember  
 %İsa misremembers that it’s snowing. (→ It’s not snowing, but İsa believes that it is.)  
 b. İsa [kar yağıp yağmadığını] yanlış hatırlıyor.  
 İsa snow precipitate.OR precipitate.NMZ wrongly remember.  
 %İsa misremembers whether it’s snowing. (→ If snow, he believes not snow; If not snow, snow.)

**II. 2. Interpretation unexpected** ► The existence of false answer readings like for (5b) pose a challenge for theories that encode truth in the interpretation of embedded questions (Groenendijk & Stokhof 1984, Karttunen 1977, and derivatives). The reason is that the truth implication contributed by the question clashes with the falsity implication contributed by the predicate. To see this, assume the semantics in (6a) for *yanlış hatırla-* or *misremember*. (A decompositional analysis of these predicates is for further research.) The entry in (6a) states that the proposition  $p$  is false at evaluation world  $w$  and that the attitude holder  $x$  believes  $p$  at  $w$ . Assume further that an embedded question  $Q$  is of type  $\langle s, \langle st, t \rangle \rangle$ , as in (6b): A map from any world  $w$  to the singleton set containing the true answer to  $Q$  at  $w$ . It is typical to extract a regular proposition out of such a set by means of an answerhood operator such as (6c), presented after it applies to (6b) (Heim 1994).

- (6) a.  $\llbracket \text{yanlış hatırla-} \rrbracket = \llbracket \text{misremember} \rrbracket = \lambda w. \lambda p. \lambda x. p(w) = 0 \wedge \text{believe}(x, p, w)$   
 b.  $\llbracket \text{whether it’s snowing} \rrbracket = \lambda w. \{p : p(w) = 1 \wedge (p = \lambda w. \text{snow}(w) \vee p = \lambda w. \neg \text{snow}(w))\}$   
 c.  $\llbracket \text{Ans} \rrbracket(w_0)(\llbracket \text{whether it’s snowing} \rrbracket) = \cap \llbracket \text{whether it’s snowing} \rrbracket(w_0) = \dots$   
 i.  $\lambda w. \text{snow}(w)$  iff it is snowing at  $w_0$  OR: ii.  $\lambda w. \neg \text{snow}(w)$  iff it is not snowing at  $w_0$

When the object in (6c) composes with the predicate in (6a), a contradiction arises: The first conjunct in (6a) asserts that the embedded proposition is false. But, by virtue of the truth inference contributed by the embedded question—the conjunct ‘ $p(w) = 1$ ’ in (6b)—the embedded proposition must true at  $w_0$ .

► A straightforward—but at this stage unsatisfactory—solution is to assume that the object language includes false-answerhood operators like in (7), in addition to true-answerhood operators like in (6c). ‘False-Ans’ applied to  $w_0$  and  $Q$  returns the set of worlds that are in the complement set ( $\bar{\cdot}$ ) of ‘Ans’ applied to  $w_0$  and  $Q$ : Those worlds  $w$  at which it is snowing if it is not snowing at  $w_0$ , or those  $w$  at which it is not snowing if it is snowing at  $w_0$ . This is the false answer at  $w_0$  to polar question  $Q$ .

- (7)  $\llbracket \text{False-Ans} \rrbracket(w_0)(\llbracket \text{whether it’s snowing} \rrbracket) = \lambda w. w \in \overline{\llbracket \text{Ans} \rrbracket(w_0)(\llbracket \text{whether it’s snowing} \rrbracket)}$

**II. 3. Distribution unexpected** ► Some theories of question embedding explain the distribution of embedded questions based on semantic properties of attitude verbs (e.g., veridicality, neg-raising), or of their (e.g., monotonicity). E.g., to account for the observations that *believe* does not embed questions, and that positive *be certain* is degraded with questions, Mayr (2018) proposes that when these predicates compose with questions, the resulting meaning is logically trivial (a tautology or a contradiction) and perceived as unacceptability (Gajewski 2002, a.o.). Applying his account to *misremember* predicts that the predicate should pattern like *be certain* and be more acceptable with questions in the positive than in the negative.

► Applying the same rationale to *misremember*, with the semantics in (6a), gives rise to a contradiction. The structure à la Mayr for (5b) is in (8a), and its truth conditions, in (8b). By assumption, Exh is obligatory. Its effect is to negate alternatives ‘S misremembers  $p$ ’ and ‘S misremembers  $\neg p$ ’ to ‘S misremembers ? $p$ .’

- (8) a. (5b): [ Exh [ [  $\exists$  whether-it’s-snowing ] [  $\lambda p$  [ İsa [ believes  $p$  ] ] ] ] ]  
 There’s a  $p \in \{\lambda w. \text{snow}(w), \lambda w. \neg \text{snow}(w)\}$  s.t. İsa believes  $p$   
 b.  $\llbracket (5b) \rrbracket(w_0) = \exists p \in Q : p(w) = 0 \wedge \text{believe}(i, p, w_0) \wedge$   
 $[\text{snow}(w_0) \wedge \text{believe}(i, \lambda w. \neg \text{snow}(w), w_0)] \wedge \neg [\text{snow}(w_0) \wedge \text{believe}(i, \lambda w. \text{snow}(w), w_0)]$